



SEQUENCE LISTING

<110> Milich, David R.
Billaud, Jean-Noel

<120> Human Hepatitis B Virus Core Proteins as Vaccine Platforms and
Methods of Use Thereof

<130> VACCINE-07971

<140> 10/630,074

<141> 2003-07-30

<160> 101

<170> PatentIn version 3.2

<210> 1

<211> 188

<212> PRT

<213> Woodchuck hepatitis B virus

<400> 1

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu
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Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp
20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys
35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu
50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln
65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys
85 90 95

Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln
100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr
115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro
130 135 140

Glu His Thr Val Ile Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser
145 150 155 160

Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro
165 170 175

Arg Arg Arg Arg Ser Gln Ser Pro Ser Ala Asn Cys
180 185

<210> 2
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<213> Woodchuck hepatitis B virus

<400> 2

Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser Pro Arg Arg Arg Thr
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Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser
20 25 30

Gln Ser Pro Ser Ala Asn Cys
35

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<213> Woodchuck hepatitis B virus

<400> 3

Arg Arg Arg Cys
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<400> 4

Arg Arg Arg Arg Cys
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<400> 5

Lys Lys Lys Cys
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<213> Woodchuck hepatitis B virus

<400> 6

Ala Ala Ala Cys
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<210> 7
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<213> Woodchuck hepatitis B virus

<400> 7

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Pro Ser Gln Ser Pro Ser
1 5 10 15

Gln Ser Pro Ser Ala Asn Cys
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<210> 8
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<213> Woodchuck hepatitis B virus

<400> 8

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Gln Ser Pro Ser Gln Ser
1 5 10 15

Pro Ser Ala Asn Cys
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<210> 9
<211> 20
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<213> Woodchuck hepatitis B virus

<400> 9

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Gln Ser Ser Gln Ser Pro
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Ser Ala Asn Cys
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<210> 10
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<213> Woodchuck hepatitis B virus

<400> 10

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Gln Ser Ser Gln Ser Ser
1 5 10 15

Ala Asn Cys

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<213> Woodchuck hepatitis B virus

<400> 11

Arg Arg Gly Gly Ala Arg Ala Ser Gln Ser Pro Ser Ala Asn Cys
1 5 10 15

<210> 12
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<213> Woodchuck hepatitis B virus

<400> 12

Ala Arg Gly Gly Ala Arg Ala Ser Gln Ser Pro Ser Ala Asn Cys
1 5 10 15

<210> 13
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<400> 13

Arg Ala Gly Gly Ala Arg Ala Ser Gln Ser Pro Ser Ala Asn Cys
1 5 10 15

<210> 14
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<213> Woodchuck hepatitis B virus

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Ala Ala Gly Gly Ala Arg Ala Ser Gln Ser Pro Ser Ala Asn Cys
1 5 10 15

<210> 15
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<213> Woodchuck hepatitis B virus

<400> 15

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser
1 5 10 15

Gln Cys

<210> 16
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<213> Woodchuck hepatitis B virus

<400> 16

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ser Ala
1 5 10 15

Asn Cys

<210> 17
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<213> Woodchuck hepatitis B virus

<400> 17

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Ser Ala Asn
1 5 10 15

Cys

<210> 18
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<212> PRT
<213> Woodchuck hepatitis B virus

<400> 18

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Ser Ala Asn Cys
1 5 10 15

<210> 19
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<400> 19

Ala Ala Gly Arg Ser Pro Ser Gln Ser Ser Gln Ser Ser Ala Asn Cys
 1 5 10 15

<210> 20
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 <213> Woodchuck hepatitis B virus

<400> 20

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Ser Ala Asn Cys
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<210> 21
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 <212> PRT
 <213> Woodchuck hepatitis B virus

<400> 21

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu
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Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp
 20 25 30

Thr Ala Ala Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Glu Glu
 50 55 60

Leu Thr Arg Leu Ile Thr Trp Met Ser Glu Asn Thr Thr Glu Glu Val
 65 70 75 80

Arg Arg Ile Ile Val Asp His Val Asn Asn Thr Trp Gly Leu Lys Val
 85 90 95

Arg Gln Thr Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln His
 100 105 110

Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro
115 120 125

Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu
130 135 140

His Thr Val Ile Arg Arg Arg Gly Gly Ser Arg Ala Ala Arg Ser Pro
145 150 155 160

Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg
165 170 175

Arg Arg Arg Ser Gln Ser Pro Ala Ser Asn Cys
180 185

<210> 22
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<213> Ground squirrel hepatitis virus
<400> 22

Arg Arg Arg Gly Gly Ser Arg Ala Ala Arg Ser Pro Arg Arg Arg Thr
1 5 10 15

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser
20 25 30

Gln Ser Pro Ala Ser Asn Cys
35

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<213> Ground squirrel hepatitis virus
<400> 23

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Pro Ser Gln Ser Pro Ser
1 5 10 15

Gln Ser Pro Ala Ser Asn Cys
20

<210> 24
<211> 21
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<213> Ground squirrel hepatitis virus

<400> 24

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Gln Ser Pro Ser Gln Ser
1 5 10 15

Pro Ala Ser Asn Cys
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<210> 25
<211> 20
<212> PRT
<213> Ground squirrel hepatitis virus

<400> 25

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Gln Ser Ser Gln Ser Pro
1 5 10 15

Ala Ser Asn Cys
20

<210> 26
<211> 19
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<213> Ground squirrel hepatitis virus

<400> 26

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Gln Ser Ser Gln Ser Ala
1 5 10 15

Ser Asn Cys

<210> 27
<211> 15
<212> PRT
<213> Ground squirrel hepatitis virus

<400> 27

Arg Arg Gly Gly Ser Arg Ala Ala Gln Ser Pro Ala Ser Asn Cys
1 5 10 15

<210> 28
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 <212> PRT
 <213> Ground squirrel hepatitis virus
 <400> 28

Ala Arg Gly Gly Ser Arg Ala Ser Gln Ser Pro Ala Ser Asn Cys
 1 5 10 15

<210> 29
 <211> 15
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 <213> Ground squirrel hepatitis virus
 <400> 29

Arg Ala Gly Gly Ser Arg Ala Ser Gln Ser Pro Ala Ser Asn Cys
 1 5 10 15

<210> 30
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 <213> Ground squirrel hepatitis virus
 <400> 30

Ala Ala Gly Gly Ser Arg Ala Ser Gln Ser Pro Ala Ser Asn Cys
 1 5 10 15

<210> 31
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 <213> Ground squirrel hepatitis virus
 <400> 31

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser
 1 5 10 15

Gln Cys

<210> 32
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 <213> Ground squirrel hepatitis virus
 <400> 32

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ala Ser
 1 5 10 15

Asn Cys

<210> 33
 <211> 17
 <212> PRT
 <213> Ground squirrel hepatitis virus

<400> 33

Ala	Ala	Gly	Arg	Ser	Pro	Ser	Gln	Ser	Pro	Ser	Gln	Ser	Ala	Ser	Asn
1				5					10					15	

Cys

<210> 34
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 <212> PRT
 <213> Ground squirrel hepatitis virus

<400> 34

Ala	Ala	Gly	Arg	Ser	Gln	Ser	Pro	Ser	Gln	Ser	Ala	Ser	Asn	Cys
1				5					10				15	

<210> 35
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 <212> PRT
 <213> Ground squirrel hepatitis virus

<400> 35

Ala	Ala	Gly	Arg	Ser	Pro	Ser	Gln	Ser	Ser	Gln	Ser	Ala	Ser	Asn	Cys
1				5					10					15	

<210> 36
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 <213> Ground squirrel hepatitis virus

<400> 36

Ala	Ala	Gly	Arg	Ser	Gln	Ser	Ser	Gln	Ser	Ala	Ser	Asn	Cys
1				5				10					

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 <213> Woodchuck hepatitis B virus

<400> 37

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gagctaacag gtagggaaca ttgctctccg caccatacag ctattagaca agctttagta	180
tgctgggatg aattaactaa attgatagct tggatgagct ctaacataac ttctgaacaa	240

gtaagaacaa tcattgtaaa tcatgtcaat gatacctggg gacttaaggt gagacaaagt 300
 ttatgggtttc atttgtcatg tctcactttc ggacaacata cagttcaaga atttttagta 360
 agttttggag tatggatcag gactccagct ccatatagac ctcctaattgc acccattctc 420
 tcgactcttc cggaacatac agtcattagg agaagaggag gtgcaagagc ttctaggtcc 480
 cccagaagac gcactccctc tcttcgcagg agaagatctc aatcaccgcg tcgcagacgc 540
 tctcaatctc catctgccaa ctgctga 567

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 <213> Woodchuck hepatitis B virus
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Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu
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Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp
 20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu
 50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln
 65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys
 85 90 95

Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln
 100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr
 115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro
 130 135 140

Glu His Thr Val Ile
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<210> 39
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 <212> DNA
 <213> Woodchuck hepatitis B virus

<400> 39
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 gaattaacag gtagggagca ttgttctcct catcatactg ctattagaca ggccttagtg 180
 tgttgggaag aattaactag attaattaca tggatgagtg aaaataacaac agaagaagtt 240
 agaagaatta ttgttgatca tgtcaataat acttggggac ttaaagtaag acagacttta 300
 tggtttcatt tatcatgtct tacttttggg caacacacag ttcaagaatt tttggtagt 360
 tttggagtat ggattagaac tccagctcct tatagaccac ctaatgcacc cattttatca 420
 actcttccgg aacatacagt ctaggagaga agaggaggtt caagagctgc taggtcccc 480
 cgaagacgca ctccctctcc tcgcaggaga aggtctcaat caccgcgtcg cagacgtct 540
 caatctccag cttccaactg ctga 564

<210> 40
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 <213> Woodchuck hepatitis B virus

<400> 40

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu
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Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp
 20 25 30

Thr Ala Ala Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Glu Glu
 50 55 60

Leu Thr Arg Leu Ile Thr Trp Met Ser Glu Asn Thr Thr Glu Glu Val
 65 70 75 80

Arg Arg Ile Ile Val Asp His Val Asn Asn Thr Trp Gly Leu Lys Val
 85 90 95

Arg Gln Thr Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln His
 100 105 110

Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro
 115 120 125

Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu
 130 135 140

His Thr Val Ile
 145

<210> 41
 <211> 183
 <212> PRT
 <213> Woodchuck hepatitis B virus

<400> 41

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Val Asn Leu Glu Asp Pro Ala
 65 70 75 80

Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys
 85 90 95

Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg
 100 105 110

Glu Thr Val Ile Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr
 145 150 155 160

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser
 165 170 175

Gln Ser Arg Glu Ser Gln Cys
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<210> 42
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 <212> PRT
 <213> Homo sapiens

<400> 42

Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg
 1 5 10 15

Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser Gln Ser Arg Glu Ser
 20 25 30

Gln Cys

<210> 43
 <211> 18
 <212> PRT
 <213> Homo sapiens

<400> 43

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser
 1 5 10 15

Gln Cys

<210> 44
 <211> 16
 <212> PRT
 <213> Homo sapiens

<400> 44

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser Gln Cys
 1 5 10 15

<210> 45
<211> 15
<212> PRT
<213> Homo sapiens

<400> 45

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10 15

<210> 46
<211> 14
<212> PRT
<213> Homo sapiens

<400> 46

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Glu Ser Gln Cys
1 5 10

<210> 47
<211> 11
<212> PRT
<213> Homo sapiens

<400> 47

Arg Arg Gly Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10

<210> 48
<211> 11
<212> PRT
<213> Homo sapiens

<400> 48

Ala Arg Gly Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10

<210> 49
<211> 11
<212> PRT
<213> Homo sapiens

<400> 49

Arg Ala Gly Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10

<210> 50
<211> 11
<212> PRT
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<400> 50

Ala Ala Gly Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10

<210> 51
<211> 18
<212> PRT
<213> Homo sapiens

<400> 51

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ser Ala
1 5 10 15

Asn Cys

<210> 52
<211> 18
<212> PRT
<213> Homo sapiens

<400> 52

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser
1 5 10 15

Gln Cys

<210> 53
<211> 17
<212> PRT
<213> Homo sapiens

<400> 53

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Glu Ser Gln
1 5 10 15

Cys

<210> 54
 <211> 15
 <212> PRT
 <213> Homo sapiens

<400> 54

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Glu Ser Gln Cys
 1 5 10 15

<210> 55
 <211> 16
 <212> PRT
 <213> Homo sapiens

<400> 55

Ala Ala Gly Arg Ser Pro Ser Gln Ser Ser Gln Ser Glu Ser Gln Cys
 1 5 10 15

<210> 56
 <211> 14
 <212> PRT
 <213> Homo sapiens

<400> 56

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Glu Ser Gln Cys
 1 5 10

<210> 57
 <211> 552
 <212> DNA
 <213> Woodchuck hepatitis B virus

<400> 57

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gccttagagt ctctgagca ttgttcacct caccatactg cactcaggca agcaattctt	180
tgctgggggg aactaatgac tctagctacc tgggtgggtg ttaatttgga agatccagca	240
tccagagacc tagtagtcag ttatgtcaac actaatatgg gcctaaagt caggcaactc	300
ttgtgggttc acatttcttg tctcactttt ggaagagaaa ccgttataga gtatttggtg	360
tctttcggag tgtggattcg cactcctcca gcttatagac caccaaatgc ccctatccta	420
tcaacacttc cggaaactac tggtgttaga cgacgaggca ggtcccctag aagaagaact	480
ccctcgcctc gcagacgaag gtctcaatcg ccgcgtcgca gaagatctca atctcgggaa	540
tctcaatggt ga	552

<210> 58
 <211> 149
 <212> PRT
 <213> Woodchuck hepatitis B virus

<400> 58

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Val Asn Leu Glu Asp Pro Ala
 65 70 75 80

Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys
 85 90 95

Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg
 100 105 110

Glu Thr Val Ile Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro
 130 135 140

Glu Thr Thr Val Val
 145

<210> 59
 <211> 12
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic

<400> 59

Val Ser Phe Gly Val Trp Ile Arg Thr Pro Ala Pro
 1 5 10

<210> 60
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 60

Val Ser Phe Gly Val Trp Ile Arg Thr Pro Pro Ala
1 5 10

<210> 61
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 61

Val Cys Trp Asp Glu Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn
1 5 10 15

Ile Thr Ser Glu Gln
20

<210> 62
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 62

Leu Cys Trp Gly Glu Leu Met Thr Leu Ala Thr Trp Val Gly Gly Asn
1 5 10 15

Leu Glu Asp Pro Ile
20

<210> 63
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 63
ggaaattctt ctcctcgag

<210> 64
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 64

Met Ser Leu Leu Thr Glu Val Glu Thr Pro Ile Arg Asn Glu Trp Gly
1 5 10 15

Cys Arg Cys Asn Asp Ser Ser Asp
20

<210> 65
<211> 18
<212> PRT
<213> Plasmodium vivax

<400> 65

Ala Asn Gly Ala Gly Asn Gln Pro Gly Ala Asn Gly Ala Gly Asp Gln
1 5 10 15

Pro Gly

<210> 66
<211> 18
<212> PRT
<213> Plasmodium vivax

<400> 66

Ala Asn Gly Ala Asp Asn Gln Pro Gly Ala Asn Gly Ala Asp Asp Gln
1 5 10 15

Pro Gly

<210> 67
<211> 22
<212> PRT
<213> Plasmodium vivax

<400> 67

Ala Pro Gly Ala Asn Gln Glu Gly Gly Ala Ala Ala Pro Gly Ala Asn
1 5 10 15

Gln Glu Gly Gly Ala Ala
20

<210> 68
 <211> 12
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic

<400> 68

Asn Ala Asn Pro Asn Ala Asn Pro Asn Ala Asn Pro
 1 5 10

<210> 69
 <211> 260
 <212> PRT
 <213> Mus musculus

<400> 69

Met Ile Glu Thr Tyr Ser Gln Pro Ser Pro Arg Ser Val Ala Thr Gly
 1 5 10 15

Leu Pro Ala Ser Met Lys Ile Phe Met Tyr Leu Leu Thr Val Phe Leu
 20 25 30

Ile Thr Gln Met Ile Gly Ser Val Leu Phe Ala Val Tyr Leu His Arg
 35 40 45

Arg Leu Asp Lys Val Glu Glu Glu Val Asn Leu His Glu Asp Phe Val
 50 55 60

Phe Ile Lys Lys Leu Lys Arg Cys Asn Lys Gly Glu Gly Ser Leu Ser
 65 70 75 80

Leu Leu Asn Cys Glu Glu Met Arg Arg Gln Phe Glu Asp Leu Val Lys
 85 90 95

Asp Ile Thr Leu Asn Lys Glu Glu Lys Lys Glu Asn Ser Phe Glu Met
 100 105 110

Gln Arg Gly Asp Glu Asp Pro Gln Ile Ala Ala His Val Val Ser Glu
 115 120 125

Ala Asn Ser Asn Ala Ala Ser Val Leu Gln Trp Ala Lys Lys Gly Tyr
 130 135 140

Tyr Thr Met Lys Ser Asn Leu Val Met Leu Glu Asn Gly Lys Gln Leu
 145 150 155 160

Thr Val Lys Arg Glu Gly Leu Tyr Tyr Val Tyr Thr Gln Val Thr Phe
165 170 175

Cys Ser Asn Arg Glu Pro Ser Ser Gln Arg Pro Phe Ile Val Gly Leu
180 185 190

Trp Leu Lys Pro Ser Ser Gly Ser Glu Arg Ile Leu Leu Lys Ala Ala
195 200 205

Asn Thr His Ser Ser Ser Gln Leu Cys Glu Gln Gln Ser Val His Leu
210 215 220

Gly Gly Val Phe Glu Leu Gln Ala Gly Ala Ser Val Phe Val Asn Val
225 230 235 240

Thr Glu Ala Ser Gln Val Ile His Arg Val Gly Phe Ser Ser Phe Gly
245 250 255

Leu Leu Lys Leu
260

<210> 70
<211> 25
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 70

Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Ser Thr Ser Ile Arg Gly
1 5 10 15

Lys Val Gln Lys Glu Tyr Ala Phe Phe
20 25

<210> 71
<211> 26
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 71

Leu Thr Ser Cys Asn Thr Ser Val Ile Thr Gln Ala Cys Pro Lys Val
1 5 10 15

Ser Phe Glu Pro Ile Pro Ile His Tyr Cys
20 25

<210> 72
<211> 25
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 72

Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala
1 5 10 15

Gly Phe Ala Ile Leu Lys Cys Asn Asn
20 25

<210> 73
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 73

Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
1 5 10 15

Ser Leu Ala Glu Glu Glu
20

<210> 74
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 74

Asp Arg Ala Ala Gly Gln Pro Ala Gly Asp Arg Ala Asp Gly Gln Pro
1 5 10 15

Ala Gly

<210> 75
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 75

Asn Ala Asn Pro Asn Val Asp Pro Asn Ala Asn Pro Asn Ala Asn Pro
1 5 10 15

Asn Ala Asn Pro
20

<210> 76
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Arg Cys Asn Asp Ser Ser Asp
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Lys Lys Lys Val Thr Ala Gln Glu Leu Asp
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Phe Arg His Asp Ser Gly Tyr
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Asp Thr Gly Phe Leu Ala Ala Leu
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Tyr Cys Phe Thr Pro Ser Pro Val
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Cys Phe Arg Lys His Pro Glu Ala
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Glu Ala Thr Tyr Ser Arg Cys Gly
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His Leu His Gln Asn Ile Val Asp
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Leu Ala Gln Lys Val Ala Arg Thr Leu Phe
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Thr Ala Val Val His Gln Leu Lys Arg Lys His
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Leu Met Arg Ser Thr Thr Lys
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Leu Glu Ala

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Asp Pro Pro Pro Pro Asn Pro Asn Asp Pro Pro Pro Pro Asn Pro Asn
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1 5 10 15